E. 1. c. Trends. The trends in abundance and distribution of bay scallop habitat are not known. The bay scallop resource is fully utilized by commercial fishermen every year. The habitat is potentially threatened by lack of controls on freshwater runoff and turbidity, both of which may be expected to increase as development paves more surfaces.

E. 1. d. Management/Regulatory Status and Trends. The habitat for bay scallops is managed only to the degree that bullraking, "kicking" clams, and dredging for clams and oysters are prohibited in seagrass beds by Marine Fisheries Commission (MFC) regulations and to the degree that Environmental Management Commission (EMC) stormwater runoff regulations reduce freshwater influx and turbidity-enhancing erosion. Most scallop habitat is included in two of the areas (Core Sound and western Bogue Sound) that have been nominated by the N.C. Division of Marine Fisheries for designation as Outstanding Resource Waters (ORWs). Increasingly intense hand raking for clams uproots large amounts of seagrass (Peterson et al. 1983) and thereby diminishes the quantity and quality of bay scallop habitat. In addition, stormwater runoff regulations are not designed to address maintenance of high salinity and low turbidity.

E. 2. Hard Clam Beds

E. 2. a. Description. *Mercenaria mercenaria* (hard clams) live in a wide range of sediment types from shell hash (oyster rocks) to sands to muds (Pratt 1953; Pratt and Campbell 1956). They generally reach their highest abundances in muddy sands and sandy muds (Wells 1957), although shell hash is the best of all bottom types (Castagna and Kraeuter 1977). Hard clams are limited to waters of relatively high salinity (permanently above about 12.5 ppt). No hard clam beds exist in Albemarle Sound because of low salinity, and few beds exist in the Pamlico Sound for the same reason. Water temperature is suitable for hard clams everywhere in the North Carolina estuaries.

Hard clams could potentially be limited in distribution, abundance, or productivity by low food supply, but that factor apparently is not limiting in North Carolina estuaries (Peterson and Beal 1989). Hard clams are often limited in both abundance and distribution by predation. Whelks probably limit productive hard clam habitat in clean sand in high salinity near Ocracoke, Hatteras, and Oregon Inlets (Peterson 1982). Blue crabs are an even more important enemy (Arnold 1984) in many areas but probably do not restrict hard clam distribution in Pamlico Sound. Hard clams are not afflicted by any significant disease problems in North Carolina.

Sediments serve as a substrate in which hard clams bury themselves. A sediment cover buffers the clams from the physiological effects of rapid temperature or salinity change in the overlying water column (Johnson 1965, 1967) and protects clams from predators. Shell hash (Castagna and Kraeuter 1977) and seagrass roots and rhizomes (Peterson 1982, 1986a) are even better types of substrate protection from predators.

The habitat serves to provide food resources for hard clams. Such food resources, mostly phytoplankton, are extremely abundant in North Carolina estuaries. Nevertheless, clams need to live in areas of appreciable horizontal advection to avoid possible depletion of foods in benthic boundary layers (Wildish and Kristmanson 1979).

Hard clam habitat does not exist in the Albemarle Sound because of low salinities. Low salinity reduces hard clam habitat in the Pamlico Sound to a relatively narrow band along the Outer Banks